

HIRDLS

HIGH RESOLUTION DYNAMICS LIMB SOUNDER

Originator: Chris M. Halvorson

Date: 2001-01-30

Subject / Title: Spectral Response Data Files

Contents / Description / Summary:

This document describes the nature and structure of version 2 of the spectral response data files, which have been created for general use within the HIRDLS program. For example, these are the data files that are used by the HIRDLS Limb Radiance Reference (HLR0) Model.

Key Words: spectral response, HLR0

Purpose (20 characters maximum): specify response

Approved / Reviewed By:

Date (yyyy-mm-dd):

National Center for Atmospheric Research
Atmospheric Chemistry Division
3300 Mitchell Lane, Suite 2300
Boulder, Colorado 80301-2272
United States of America

EOS

File Names and Location

The latest version of the spectral response data files are always located in the directory /hir1t/HIRDLS/HIRRAD/HLR0 of the HIRDLS Science Computer Facility (SCF). The general form of the file names is

response_cCC_vVV.dat,

where CC is the two-digit channel number of the specific channel and VV is the two-digit version number of the specific data file version. The channel numbers are 01 to 21, and the version number is 02.

File Format

The data files are sequential, ANSI-IEEE binary files. The specific structure of the data files is illustrated by the following Fortran 95 input code sample:

```
implicit none

! Integer Parameters
! -----
! response_unit = input unit number for the spectral response data file

integer(kind=4), parameter :: response_unit = 1

! Integer Variables
! -----
! N_sigma = number of wave number grid points

integer(kind=4) :: N_sigma

! Character Variables
! -----
!      version = version number of the spectral response data file
! ID_response = ID number assigned to the spectral response data by The
!              University of Reading
!      header = header of the spectral response data file

character(len=2) :: version
character(len=16) :: ID_response
character(len=56) :: header

! Real Variables
! -----
!      sigma_l = wave number [cm-1] of the lower passband boundary
! DELTAsigma = wave number grid size [cm-1]
```

```

!      sigma = wave number grid [cm-1]
!      response = spectral response

real(kind=8) :: sigma_1,DELTAsigma
real(kind=8), allocatable :: sigma(:),response(:)

open(unit=response_unit,&
      file='/hirlt/HIRDLS/HIRRAD/HLR0/response_c18_v02.dat','status='old',&
      form='unformatted',action='read')
read(unit=response_unit) version,header,ID_response,N_sigma,sigma_1,&
      DELTAsigma
allocate (sigma(N_sigma),response(N_sigma))
read(unit=response_unit) sigma,response
close(unit=response_unit,status='keep')

```

Data Parameters

The response functions for all 21 spectral channels are based on actual measurements of the optical components. The variable "ID_response" contains the name that The University of Reading gave to the original response file. For version 2 of the data files, this original data was reformatted and put on a grid with $\Delta\sigma = 0.002 \text{ cm}^{-1}$ and the following passbands:

| Channel Number | Lower 0.2 % Response Point [cm^{-1}] | Upper 0.2 % Response Point [cm^{-1}] |
|----------------|---|---|
| 1 | 555 | 596 |
| 2 | 592 | 622 |
| 3 | 600 | 652 |
| 4 | 616 | 667 |
| 5 | 645 | 694 |
| 6 | 812 | 845 |
| 7 | 825 | 860 |
| 8 | 840 | 928 |
| 9 | 907 | 942 |
| 10 | 980 | 1021 |
| 11 | 996 | 1060 |
| 12 | 1109 | 1150 |
| 13 | 1194 | 1232 |
| 14 | 1214 | 1274 |
| 15 | 1245 | 1291 |
| 16 | 1265 | 1308 |
| 17 | 1300 | 1391 |
| 18 | 1368 | 1457 |
| 19 | 1394 | 1423 |
| 20 | 1368 | 1576 |
| 21 | 1554 | 1660 |